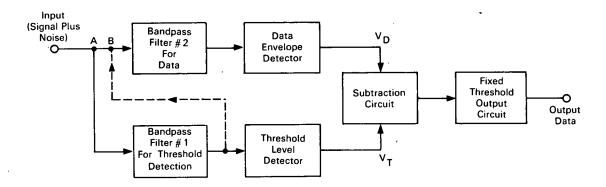
## NASA TECH BRIEF



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## Circuit Maintains Digital Decision Threshold at Preset Level



The problem: To maintain the optimum decision threshold in digital information link equipment regardless of input-signal and noise-level amplitude variations. Commonly used automatic-gain-control (AGC) circuits are nonlinear in operation, too slow in response for digital system application, and make a receiver quite complex.

The solution: An optimum decision-level circuit that will maintain the decision threshold at any preselected percentage of the input-signal amplitude.

How it's done: The optimum decision-level circuit consists of a pair of bandpass filters, one detector each for the data envelope and the threshold level, a subtraction circuit, and a fixed-threshold output circuit.

The threshold-level detector detects the peak signalplus-noise passed by bandpass filter #1. This detector has a fast attack time to provide a threshold voltage to the subtraction circuit before information from the data envelope detector arrives. The voltage decay time of the threshold-level detector is slow relative to the information pulse rate, but fast enough to follow any normal input signal-level variation. The threshold-level detector is variable to provide any desired threshold voltage relative to the amplitude of the data-envelope detector output.

Bandpass filter #2 separates the signal from the noise and feeds it to the data-envelope detector, which recovers the modulation from the carrier and feeds it to the subtraction circuit. The subtraction circuit compares the envelope detector output  $V_D$ , with the peak voltage  $V_T$  of the threshold-level detector. When  $V_D$  is greater than  $V_T$ , the fixed-threshold output circuit produces an output data pulse.

## Notes:

- 1. This invention would be useful with communications equipment involving recognition of transmitted digital information.
- 2. The alternate connection indicated by the dashed line may be desirable when the bandwidth of filter #1 is equal to or greater than that of filter #2. In this case, the line from A to B is omitted.

(continued overleaf)

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